

Chapter 0

Null and Void

Zero hit the USS *Yorktown* like a torpedo.

On September 21, 1997, while cruising off the coast of Virginia, the billion-dollar missile cruiser shuddered to a halt. *Yorktown* was dead in the water.

Warships are designed to withstand the strike of a torpedo or the blast of a mine. Though it was armored against weapons, nobody had thought to defend the *Yorktown* against zero. It was a grave mistake.

The *Yorktown*'s computers had just received new software that was controlling the engines. Unfortunately, nobody had spotted the time bomb lurking in the code, a zero that engineers were supposed to remove while installing the software. But for one reason or another, the zero was overlooked, and it stayed hidden in the code. Hidden, that is, until the software called it into memory—and choked.

When the *Yorktown*'s computer system tried to divide by zero, 80,000 horsepower instantly became worthless. It took nearly three hours to attach emergency controls to the engines, and the *Yorktown* then limped into port. Engineers spent two days getting rid of the zero, repairing the engines, and putting the *Yorktown* back into fighting trim.

No other number can do such damage. Computer failures like the one that struck the *Yorktown* are just a faint shadow of the power of zero. Cultures girded themselves against zero, and philosophies crumbled under its influence, for zero is

different from the other numbers. It provides a glimpse of the ineffable and the infinite. This is why it has been feared and hated—and outlawed.

This is the story of zero, from its birth in ancient times to its growth and nourishment in the East, its struggle for acceptance in Europe, its ascendance in the West, and its ever-present threat to modern physics. It is the story of the people who battled over the meaning of this mysterious number—the scholars and mystics, the scientists and clergymen—who each tried to understand zero. It is the story of the Western world's attempts to shield itself unsuccessfully (and sometimes violently) from an Eastern idea. And it is a history of the paradoxes posed by an innocent-looking number, rattling even this century's brightest minds and threatening to unravel the whole framework of scientific thought.

Zero is powerful because it is infinity's twin. They are equal and opposite, yin and yang. They are equally paradoxical and troubling. The biggest questions in science and religion are about nothingness and eternity, the void and the infinite, zero and infinity. The clashes over zero were the battles that shook the foundations of philosophy, of science, of mathematics, and of religion. Underneath every revolution lay a zero—and an infinity.

Zero was at the heart of the battle between East and West. Zero was at the center of the struggle between religion and science. Zero became the language of nature and the most important tool in mathematics. And the most profound problems in physics—the dark core of a black hole and the brilliant flash of the big bang—are struggles to defeat zero.

Yet through all its history, despite the rejection and the exile, zero has always defeated those who opposed it. Humanity could never force zero to fit its philosophies. Instead, zero shaped humanity's view of the universe—and of God.